

ORIGINAL ARTICLE

## Delivery Outcome among Induced Versus Spontaneous Labor in Nulliparous Women

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### ABSTRACT

**Objective:** To assess the delivery outcome in nulliparous women at term and to compare the outcomes among induced versus spontaneous labor.

**Methods:** A descriptive study was conducted at Obstetrics and Gynecology department of Patel Hospital, Karachi from April to October 2019. All women with age between 20-40 years, gestational age between 37-42 weeks, and singleton pregnancy were consecutively included. Mode of delivery and Apgar score at 5 minutes were noted.

**Results:** Of 172 women, the mean age of the women was  $29.9 \pm 4.64$ . Vaginal delivery was reported in 102 (59.3%) and cesarean section in 70 (40.7%) women. Cesarean delivery was found to be significantly higher among women with >29 years of age (p-value 0.006), >38 weeks of gestational age (p-value <0.001), obesity (p-value <0.001), and induction of labor (p-value 0.020). Mean APGAR score at 1 min was  $7.45 \pm 0.69$  and APGAR score at 5min was  $8.84 \pm 0.41$ . Mean APGAR score at 5 minutes was significantly higher in women vaginal delivery than that of women with cesarean delivery (p-value 0.034).

**Conclusion:** The frequency of vaginal delivery was found higher in nulliparous women presenting at term. Moreover, APGAR score at 5 minutes was found to be significantly different in both groups.

**Keywords:** Caesarean delivery, Induction of labor, maternal outcome, Induced labor, Spontaneous labor, Nulliparous women.

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### INTRODUCTION

One of the most common procedures for obstetrics is the induction of labor. It is reported that one fifth of all pregnancies require induction procedure.<sup>1,2</sup> Some studies suggest that induction of pregnancy increases the risk of complications due to uterine overactivity or atony.<sup>3,4</sup>

Various studies have reported that in women with induced labor, caesarean sections were considerably higher than in women with spontaneous labor. Mean Apgar score, however, was better than spontaneous labor in induced labor.<sup>5-7</sup> Induced labor was proposed to increase the chances of caesarean section and have no adverse impact on the neonatal outcome. Therefore, induced labor is recommended to be a safe procedure for nulliparous women if labor is controlled in a partographic way.<sup>7,8</sup>

Previous literature showed varied results and found that induced labor is associated with complications and caesarean section as compared to spontaneous labor.<sup>7-10</sup> Moreover, a thorough literature search has revealed dearth of local studies on this topic particular from private sector hospitals. Therefore, we planned this

study to evaluate the rate of induced labor in nulliparous women and to compare delivery outcome between induced and spontaneous labor at term.

### METHODS

This descriptive study was carried out at Obstetrics and Gynaecology department, Patel Hospital, Karachi from April to October 2019. All women of age between 20-40 years presenting at gestational age between 37-42 weeks assessed on dating scan with singleton pregnancy confirmed on ultrasound, gestational hypertension (BP>140/90 mmHg), gestational diabetes (BSR>140 mg/dl), intact membranes on examination, and active phase of labor with cervical dilation at least 4cm were consecutively enrolled. Whereas patients with non-cephalic presentation (on USG), previous scar, anemia (Hb<10g/dl), eclampsia (BP≥140/90mmHg with convulsions), placenta previa, cephalopelvic disproportion, multiple pregnancy (with 1<sup>st</sup> noncephalic twin), have previous uterine surgery on history and were confirmed through discharge card, multiple gestation on ultrasound, gestational age less than 28 weeks, caesarean Section done for reasons like

placenta previa, primi breach presentation (diagnosed by ultrasonography), and fetal distress in first stage of labor (diagnosed by strict fetal monitoring by fetoscope during labor) were excluded.

A sample of 172 women was estimated with 95% confidence level, reported percentage of caesarean section with induced labor i.e. 20% at margin of error 6%.<sup>6</sup> All females underwent induced labor with 3mg dinoprostone vaginally. Dose were repeated after six hours. Maximum allowable up to two doses (6 microgram of the drug). While females underwent spontaneous initiation of labor, all were followed-up till delivery. Regarding delivery outcomes, mode of delivery and Apgar score at 5-minutes were noted. Nulliparous was defined as if female has never given birth to a viable child before current pregnancy. Apgar score were measured in term of mean and standard deviation recorded after 1 minute and 5 min of birth. This information of outcome variable and demographics like age, gestational age, and obesity were noted.

Statistical analysis was done using SPSS version 20. Mean  $\pm$ SD for quantitative while frequencies and percentages for quantitative variables were computed. Inferential statistics were calculated using chi-square test and independent sample t-test. P-value  $\leq$ 0.05 was taken as significant.

## RESULTS

The average age of the women was  $29.9 \pm 4.64$  (ranging: 10+20 years). Spontaneous induction of labor was observed in 118 (69%) women. Most of the women found obese i.e. 115 (67%) who had body mass index more than  $30 \text{ kg/m}^2$ . Gestational age of 148 women (86%) was more than 38 weeks while 24(14%) was observed less than 38 weeks. A total of 102 (59.3%) women delivered through vaginal and 70 (40.7%) women delivered by cesarean section. (Table 1)

Cesarean delivery was found to be significantly higher among women with  $>29$  years of age (p-value: 0.006),  $>38$  weeks of gestational age (p-value:  $<0.001$ ), obesity (p-value:  $<0.001$ ), and induction of labor (p-value: 0.020). (Table 2)

Mean APGAR score at 1-minute was  $7.45 \pm 0.69$  and APGAR score at 5-minutes was  $8.84 \pm 0.41$ . Mean APGAR score at 5-minutes was significantly higher in women vaginal delivery than that of women with cesarean delivery (p-value: 0.034). (Table 3)

## DISCUSSION

Labor induction is one of the main procedures in obstetrics, and is not risk-free.<sup>11,12</sup> In many circumstances, induction of labor may either result in an increase or a decrease in maternal or perinatal morbidity.<sup>13-15</sup>

**Table 1: Descriptive statistics of the patients (n=172)**

Descriptive Statistics	Mean $\pm$ SD	Range (Max-Min)
Age	$29.9 \pm 4.64$	22(42-20)
Height	$1.6 \pm 0.06$	0.49(1.73-1.24)
Weight	$76.17 \pm 9.94$	50(108-58)
BMI	$30.83 \pm 3.35$	18(42-24)
Gestational Age	$38.37 \pm 1.93$	10(42-32)
	<b>n</b>	<b>%</b>
<b>Classification of labor</b>		
Spontaneous	118	69
Induced	54	31
<b>Obesity</b>		
Yes	115	67
No	57	33
<b>Mode of delivery</b>		
Vaginal	102	59.3
Cesarean Section	70	40.7

SD: Standard deviation, Max: Maximum, Min: Minimum n: number

**Table 2: Comparison of mode of delivery with general characteristics of the patients (n=172)**

Variables	Mode of delivery			P-value
	Vaginal Delivery	Caesarean Section	Total	
<b>Age</b>				
≤29 Years	58(33.7%)	25(14.5%)	83(48.3%)	0.006*
>29 Years	44(25.6%)	45(26.2%)	89(51.7%)	
<b>Gestational age</b>				
≤38 Weeks	2(1.2%)	22(12.8%)	24(14%)	<0.001
>38 Weeks	100(58.1%)	48(27.9%)	148(86%)	
<b>Obesity</b>				
Yes	56(32.6%)	59(34.3%)	115(66.9%)	<0.001
No	46(26.7%)	11(6.4%)	57(33.1%)	
<b>Type of Labor</b>				
Induced	39(22.7%)	15(8.7%)	54(31.4%)	0.020
Spontaneous	63(36.6%)	55(32%)	118(68.6%)	

Chi-square test applied, p-value <0.05 taken as significant

**Table 3: Mean difference of APGAR at 1 and 5 minutes with respect to mode of delivery (n=172)**

APGAR Score	Mode of delivery			p-value
	Vaginal Delivery	Caesarean Section	Total	
Mean APGAR at 1 minute	7.51 ±0.69	7.39 ±0.71	7.46 ±0.7	0.251
Mean APGAR at 5 minutes	8.9 ±0.33	8.76 ±0.49	8.84 ±0.41	0.034*

Independent t-test applied, p-value <0.05 taken as significant

The successful vaginal delivery rate in those induced was 22.7% compared to 36.6% in those with spontaneous labor. This difference was statistically significant, which is in agreement with those documented in the literature.<sup>16-18</sup>

Comparatively, the study's successful induction rate was lower than previous study reported.<sup>19</sup> Our successful induction rate was, however, similar to that reported in the large Latin American Study.<sup>20</sup>

Orji et al.<sup>21</sup> achieved successful labor induction in 64.7% nulliparous cases following use of vaginal misoprostol compared to 72.1% in women with spontaneous labor.<sup>21</sup>

In this study, induced labor was associated with a higher caesarean rate (32.3%) compared to 16.4% in those who had spontaneous onset labor. This finding is consistent with other studies.<sup>21-23</sup>

Caesarean section rate in this study was observed to be higher in nulliparous women in both the induced and spontaneous labor groups. This was similar to findings of Orji et al.<sup>21</sup>

Regarding mode of delivery, spontaneous onset of labor had more vaginal deliveries as compared to induced labor group while vice versa for caesarean section. Our results were comparable to a study in which they found that a larger proportion of spontaneous

group females had vaginal deliveries compared to induced group and also a smaller proportion of spontaneous group ends up on caesarean section.<sup>24</sup>

Women with nulliparous status are suspected as an independent detrimental factor for elective induction, which is contrary to some studies and found it to be a protective effect.<sup>25-27</sup>

The findings of this study have certain limitation. Firstly, the study was a descriptive study. Further exploratory research is recommended to explore the outcome of this study. Secondly, this study has reported findings from a single center. Despite of these limitations, the current study was conducted on an ample number of cases from a private sector hospital of metropolitan city Karachi.

## CONCLUSION

In nulliparous women presenting at term, the frequency of vaginal delivery was found to be higher. In addition, it was found that APGAR performance at 5 minutes is significantly different in both classes. The findings of this study have indicated that a decline in cesarean birth in nulliparous women is correlated with the elective induction of labor at more than 38 weeks gestation.

### ETHICAL APPROVAL

Patel Hospital Ethical Review Board approval was obtained before the start of study.

### CONFLICT OF INTEREST

Authors declared no conflict of interest.

### AUTHORS' CONTRIBUTION

AR: Planned and designed the study, analysed the results of the study, wrote the discussion and reviewed the final draft. AB, SSD Collected data and reviewed the final draft.

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